FULTON INDUSTRIAL BOULEVARD (FIB) FRAMEWORK

RAPID HEALTH IMPACT ASSESSMENT (HIA)

DEPARTMENT OF HEALTH SERVICES
Atlanta, GA

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BACKGROUND

As approved on April 7, 2010 by the Fulton County Board of Commissioners, the Fulton Industrial Boulevard (FIB) Redevelopment Framework called for a Health Impact Assessment (HIA) of the FIB Redevelopment area. An HIA is most effective when it is conducted during the initial stages of a plan, policy, development, etc. Even though a HIA was not a part of the planning and drafting stages of the FIB Redevelopment Framework, prior to its approval, and since components of the Framework have been completed, it was determined that the findings and recommendations of this HIA would be useful to enhance the plan. This report presents the expected health impacts from implementation of the FIB Redevelopment Framework as well as recommendations for mitigation of the anticipated negative health impacts that would cause health outcomes to exceed existing conditions.

METHODOLOGY

Representatives from other Fulton County Departments, community members near FIB, and business leaders along the FIB corridor provided information as requested. Information gathered from surveys, community meetings, phone calls, and e-mails were incorporated into the HIA development process. After assessing the potential impacts of the FIB Framework, the most critical anticipated health outcomes, the significance of occurrence, the expected at-risk population(s), and the FIB community were considered in determining the impacts on which this HIA should focus.

The overall goal of this HIA is to provide sound public health position, reasoning, and recommendations based on scientific evidence regarding the FIB Revitalization Plan while properly considering the preferences and values of affected groups. The underlying values are that public health is the top priority and that environmental justice is an intricate part of the assessment. The objectives are to prioritize health impacts; to provide an accurate assessment based on proven data; and to effectively communicate the assessment to stakeholders. Decisions within the HIA [itself] were made were made by the Environmental Planner and the Medical Director. The final recommendations were reviewed and approved by the Medical Director of the Fulton County Department of Health Services and the County Health Officer.

ASSESSMENT

It is important that measures are planned and implemented in the anticipation of the commercial growth in the FIB area. The current concern of the surrounding residential community is air quality. Since FIB is an industrial corridor it is critical to understand existing conditions in context of Fulton County as a whole. The following are tables depicting the emission levels within Fulton County from various sources.

Table 1. Fulton County's 2005 Carbon Monoxide Emissions	
Source	**Total Emissions (Tons)**
On-road Vehicles	159,974
Non-road Equipment	59,628
Fossil Fuel Combustion	2,830
Residential Wood Combustion	2,261
Industrial Processes	500
Waste Disposal	337
Miscellaneous	92
Fire	0
Solvent Use	0
Information retrieved from Environmental Protection Agency website: http://www.epa.gov/airquality (Retrieved on 6/22/10).	

When carbon fuel does not burn completely, carbon monoxide is formed. This colorless and odorless gas is a component of motor vehicle exhaust. Motor vehicle exhaust is the source of approximately 56% of all carbon monoxide emissions nationwide.

Table 2. Fulton County's 2005 Lead Emissions	
Source	**Total Emissions (Tons)**
Fossil Fuel Combustion	2
Non-road Equipment	1
Industrial Processes	< 1
Miscellaneous	0
Information retrieved from Environmental Protection Agency website: http://www.epa.gov/airquality (Retrieved on 6/22/10).	

Motor vehicle fuel as a source of lead has been significantly reduced through federal regulations, including the removal of lead from gasoline.

Table 3. Fulton County's 2005 Nitrogen Dioxide Emissions	
Source	**Total Emissions (Tons)**
On-road Vehicles	26,110
Non-road Equipment	6,885
Fossil Fuel Combustion	3,958
Industrial Processes	1,993
Waste Disposal	68
Residential Wood Combustion	29
Solvent Use	17
Miscellaneous	2
Fires	0
Information retrieved from Environmental Protection Agency website: http://www.epa.gov/airquality (Retrieved on 6/22/10).	

Nitrogen dioxide is an indicator for other nitrogen oxides, nitrous acid and nitric acid. It is highly reactive and is formed from several sources including car, truck, and bus emissions. Nitrogen dioxide is a contributor to ground-level ozone and particulate matter formation.

Table 4. Fulton County's 2005 Particulate Matter (10) Emissions	
Source	**Total Emissions (Tons)**
Road Dust	9,437
Miscellaneous	4,336
Industrial Processes	1,226
On-road vehicles	782
Fossil Fuel Combustion	732
Non-road Equipment	568
Residential Wood Combustion	315
Waste Disposal	20
Information retrieved from Environmental Protection Agency website: http://www.epa.gov/airquality (Retrieved on 6/22/10).	

Table 5. Fulton County's 2005 Particulate Matter (2.5) Emissions	
Source	**Total Emissions (Tons)**
Industrial Processes	936
Road Dust	626
On-Road Vehicles	554
Fossil Fuel Combustion	543
Non-Road Equipment	541
Miscellaneous	445
Residential Wood Combustion	315
Waste Disposal	15
Information retrieved from Environmental Protection Agency website: http://www.epa.gov/airqualityr (Retrieved on 6/22/10).	

Since the size of particulate matter has a direct link to the health causing potential, the particles that are smaller than 10 micrometers in diameter are of most concern. They can pass through the nose and throat, entering the lungs. Inhalable particles (greater than 2.5 micrometers and smaller than 10 micrometers in diameter) can be expected to be found near roadways as well as dusty industries. Fine particles (2.5 micrometers in diameter and less) are found in smoke and haze that is formed from industry and automobile gas emissions reacting in the air.

Table 6. Fulton County's 2005 Volatile Organic Compounds Emissions	
Source	**Total Emissions (Tons)**
Solvent Use	20,810
On-Road Vehicles	14,753
Non-road Equipment	4,816
Miscellaneous	2,453
Industrial Processes	1,495
Residential Wood Combustion	485
Fossil Fuel Combustion	227
Waste Disposal	220
Fires	0
Information retrieved from Environmental Protection Agency website: http://www.epa.gov/airquality (Retrieved on 6/22/10).	

Volatile Organic Compounds (VOCs) chemically react in sunlight with nitrogen oxides to produce ozone at ground-level. Emissions from industries and motor vehicles are partial contributors to the VOCs emissions and to ground-level ozone formation.

Table 7. Fulton County's 2005 Sulfur Dioxide Emissions	
Source	**Total Emissions (Tons)**
Fossil Fuel Combustion	4,280
Industrial Processes	2,023
Non-road Equipment	705
On-road Vehicles	507
Waste Disposal	5
Residential Wood Construction	4
Information retrieved from Environmental Protection Agency website: http://www.epa.gov/airquality (Retrieved on 6/22/10).	

Motor vehicle exhaust has a relatively smaller contribution to sulfur dioxide emissions than emission levels of other criteria pollutants.

Based upon this data, a significant portion of pollutants within Fulton County are emitted from on-road vehicles, non-road equipment, and fossil fuel combustion. However, the greatest source is from on-road vehicles, on which this HIA is focused.

Framework Component: **Increased # Vehicles on the Road from**
- **Widening of State Route 70 (FIB)**
- **Increase in Commercial and Industrial Businesses**

In the absence of convenient, alternative modes of transportation, more people are anticipated to visit the area for business and leisure, deciding to drive to the new and existing destinations and businesses along FIB. Frequently, the solution to increased vehicular capacity is to widen the roadway causing induced traffic. Even though mobility, convenience, and flexibility are benefits, oftentimes temporary, to vehicle travel, increased capacity of roadways leads to increased traffic and vehicle-miles of travel (VMT). Based upon a review of various sources of information, the widening of FIB is likely to encourage increased commuting of Fulton County residents as well as residents of surrounding counties. The Hanson study cited by the Environmental Protection Agency (EPA) technical review, entitled *Our Built and Natural Environments*, noted that "vehicle miles traveled on state highways increase, on average, by 0.6 to 0.7 percent at the county level for each 1 percent increase in highway miles, and by 0.9 percent at the metropolitan level. The full increase in VMT materializes within five years of the change in road supply."

Impact: Increasing VMT and/or the volume of vehicles increases the amount of on-road pollutants emitted into the air. The following table shows the 2005 on-road emission totals of criteria pollutants for Fulton County compared to surrounding counties.

Table 8. 2005 On-Road Emission Totals for Fulton, Cobb, DeKalb, and Gwinnett Counties By Criteria Pollutant

Criteria Pollutant	Fulton (Tons)	Cobb (Tons)	DeKalb (Tons)	Douglas (Tons)	Gwinnett (Tons)
Carbon Monoxide (CO)	159,974	102,630	88,568	19,982	93,263
Nitrogen Oxides (NO_x)	26,110	14,540	16,733	3,232	15,327
Particulate Matter (PM_{10})	782	432	501	1,878	455
Particulate Matter ($PM_{2.5}$)	554	306	305	96	322
Volatile Organic Compounds (VOCs) –Ozone (O_3) precursor	14,753	8,620	9,437	68	9,134
Sulfur Dioxide (SO_2)	507	280	324	62	294

Information retrieved from Environmental Protection Agency website: http://www.epa.gov/airquality/urbanair (Retrieved on 6/22/10).

Relative to surrounding counties, Fulton County has the highest levels of carbon dioxide emissions. The carbon monoxide level is also greatest, according to 2005 data, of all criteria pollutants emitted in Fulton County. Higher levels of carbon monoxide can be expected in heavy traffic congestion. There are periods of traffic congestion that already exist in the FIB area. Increased business activity in the FIB area (I-285, I-20, and SR 70) will likely increase the duration and severity of the traffic congestion.

Expected Health Outcome(s): There is proven data on the health impacts from criteria pollutants. The chart below presents the evidence found.

Table 9. Health Impacts of Criteria Pollutants

Criteria Pollutant	Health Impacts
Carbon Monoxide (CO)	- Affects the capacity of hemoglobin in the blood to absorb oxygen - Impairs cardiovascular and nervous system - Impairs visual perception and manual dexterity - Interferes with fetal growth and tissue development - Causes fatality in extremely high concentrations
Lead (Pb)	- Increases blood pressure - Increases heart disease risk - Affects neurological system (seizures, mental retardation, and/or behavioral disorders) - Impairs mental functions in children (e.g. decreases IQ)
Nitrogen Dioxide ($NO_{2)}$	- Irritates lungs - Potentially damages lungs in susceptible populations (i.e. those with asthma)
Particulate Matter (PM)	- Induces coughing - Damages lung tissue - Alters immune system - Exacerbates respiratory diseases and existing respiratory diseases - Exacerbates cardiovascular diseases and existing cardiovascular diseases - Increases cancer risk
Ozone ($O_{3)}$	<u>Short-term exposure:</u> - Potentially irritates lung temporarily - Irritates eye (minor irritation) - Induces coughing - Causes pain when inhaling (short-term exposure) <u>Long-term exposure</u> - Causes structural lung damage - Leads to chronic lung disease, lung cancer, and increased susceptibility to respiratory infections - Interferes with immune system - Acts as possible agent for infectious disease - Aggravates allergies

Table 9. Health Impacts of Criteria Pollutants	
Criteria Pollutant	**Health Impacts**
Sulfur Dioxide (SO_2)	- Constricts bronchial passages - Alters defenses of the lungs - Affects breathing, asthma, and respiratory illness - Increases risk of acute illness or premature death during periods of SO_2 and PM combination for individuals with pre-existing chronic lung and heart diseases
Information collected from various sources.	

Based upon the review of various sources of research, a negative health outcome is anticipated regarding respiratory illnesses and chronic diseases. The anticipated increase in air pollutants from the expected increase in traffic along FIB is likely to be a significant contributing factor in increasing respiratory symptoms, hospitalization for heart and lung diseases, and premature death, if no action is taken.

Affected Populations:

Unusually sensitive persons are at risk of experiencing aforementioned health outcomes when the Air Quality Index (AQI) is considered moderate (See Definitions for further explanation.). Those persons with asthma, chronic bronchitis, emphysema, and/or heart disease when exposed to unhealthy levels of pollutants of 101 or above are prone to experience symptoms. Children and the elderly are also particularly affected. At an AQI Index of 151 or higher, all populations are affected. Zip code 30331 has experienced higher rates of hospitalization discharges and mortality than those rates seen across Fulton County, which may indicate issues related to respiratory and chronic diseases (See Appendix.).

Research indicates that exposure of older adults (elderly) to particulate matter leads to negative health outcomes such as pulmonary inflammation, chronic obstructive pulmonary disease (COPD), cardiovascular disease, asthma, and mortality.

The developing respiratory organs of children are particularly susceptible to the direct, irritating and destructive affects of criteria pollutants, whereas adults have an inherently higher risk of outcomes such as myocardial infarctions (i.e. heart attacks) which is also exacerbated by these pollutants. Of note, individuals under the age of 18 years make up 29.2% of the population of zip code 30331 as of 2000 (See Appendix.).

RECOMMENDATIONS

1: **Roadway design and traffic synchronization should provide for an effective flow of traffic in the area of FIB and I-20 as part of an area-wide traffic plan in anticipation of increased traffic capacity, particularly during peak hours.**

Rationale: An effective roadway design and traffic flow plan is likely to reduce idling times and thus reduce air pollution and its health effects. Roadway design also has been shown to predict pedestrian injuries. An effective plan is likely to improve pedestrian safety by decreasing the risk of pedestrian injury from motor vehicles.

2: **Area and regional transportation plans should be enhanced to improve transit and/or alternative modes of transportation to decrease personal driving in the FIB area.**

Rationale: When there are convenient opportunities for transit and alternative modes of transportation, it is likely that there would be less VMT and less contribution to air pollution in the area. In addition, meaningful availability of modes of transportation other than by personal vehicle is likely to provide opportunity for the lower income population to access the area and to benefit from expected job opportunities. Because the convenient availability of alternative modes of transportation, it is likely that more people will make decisions not to drive personal vehicles, and there will be more pedestrians visible. Based upon various research data, it can be predicted that the anticipated increase in volume of pedestrians coupled with lower vehicle volume is likely to decrease the risk of injury of pedestrians from collisions caused by motor vehicles along FIB.

3: **An anti-idling ordinance should be implemented.**

Rationale: By implementing a "No idling" ordinance, greenhouse gas (GHG) emissions would likely be reduced. In addition, energy and money are saved. Implementation of such an ordinance will also reduce the amount of PM from vehicles, particularly vehicles utilizing diesel fuels. Vehicles using diesel fuels emit more PM than vehicles using gasoline. According to various studies, reduction of a PM source significantly reduces the number of adverse health impacts. Furthermore, CO is a major component of vehicle exhaust, causing a contribution of 56% of all CO emissions nationwide.

4: **There should be no residential uses or zoning along the FIB corridor including within Tourist Accommodations.**

Rationale: Families with less income are more likely to live near sources of air pollution from industrial and roadway sources. There is a significant population of lower income individuals and families in the FIB area, particularly in tourist accommodations. Many of the people in the tourist accommodations are children, who are susceptible to the affects of air pollutants.

5: **There should be education and intervention to assist FIB area businesses to implement EPA recommended strategies to reduce emission from diesel trucks and to encourage similar practices for trucking companies serving the area.**

Rationale: Diesel engines are a major source of pollution. These emissions can damage plants, animals, crops, and water resources. EPA recommends a wide range of emission reduction strategies to suit any type of diesel vehicle or equipment. These include:

- Install diesel retrofit devices with verified technologies
- Maintain, repair, rebuild, repower engines
- Replace vehicles and equipment
- Improve operational strategies
- Use cleaner fuels including natural gas and propane

EPA estimates that every $1 spent on clean diesel projects produces up to $13 of public health benefits. Reducing greenhouse gas (GHG) emissions from diesel engines through improved fuel economy is likely to help address climate change, improve our nation's energy security, and strengthen our economy.

CONCLUSION:

Implementation of any or all of these recommendations are likely to mitigate the amount of exposure of the population, particularly the at risk populations, to pollutants and GHGs. These reductions would improve air quality, thus positively improving the health of at risk populations and providing strategies to prevent additional negative health outcomes, beyond what already exists, caused by poor air quality. Addressing potential air quality issues anticipated from the implementation of the FIB Framework is important to successfully achieving other goals, such as increased physical activity, improved bicycle and pedestrian plan, and reducing the affects upon at risk populations. It is further recommended that health input is sought and considered during and along with drafting of any future revisions of roadway designs, traffic plans, bicycle and pedestrian plans, Fulton County Airport Brown Field, etc.

DEFINITIONS

Air Quality Index (AQI)

Environmental Protection Agency's tool that state and local agencies use to issue public reports of actual levels of particles, ground-level ozone, and other common air pollutants.

AIR QUALITY INDEX (AQI) VALUES	LEVELS OF HEALTH CONCERN	COLORS
When the AQI is in the range:	**Air Quality Conditions are:**	**Symbolized by the color:**
0 – 50	Good	Green
51 – 100	Moderate	Yellow
101 – 150	Unhealthy for sensitive groups	Orange
151 – 200	Unhealthy	Red
201 – 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon
Information retrieved from http://www.airnow.gov/index.cfm?action=aqibasics.index		

Criteria pollutant

Carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10} & $PM_{2.5}$), ozone (O_3), and sulfur (SO_2), for which Environmental Protection Agency (EPA) has set National Ambient Air Quality Standards (NAAQS) as criteria pollutants, produced from vehicles traveling roadways.

Chronic Obstructive Pulmonary Disease (COPD)

A disease that becomes worse over time and makes it difficult to breathe. It can cause mucus-producing coughs, shortness of breath, whizzing, and tightness of chest along with other symptoms.

Greenhouse Gas

Gases that trap heat in the atmosphere.

Health Impact Assessment

A toolkit of procedures and methods based in scientific evidence to weigh the potential health affects from a policy, law, program, or project upon a population.

Hemoglobin

A protein-based component of blood cells. Its primary function is to transfer oxygen to the lungs.

Induced traffic

A term for traffic growth produced by the addition of highway capacity.

Mortality

A term meaning death rate of a population.

DEFINITIONS (continued)

On-Road Emissions

Releases of pollutants from cars, vans, trucks, buses, and motorcycles.

Particulate Matter (particle pollution)

A mixture of extremely small particles and liquid droplets made of acids, organic chemicals, metals, and soil (dust) particles.

Pulmonary Inflammation

Inflammation of the lining of the lungs. It is also know as Pleurisy, which has sharp chest pains as a key symptom.

Traffic Synchronization

A term for the use of traffic lights and signals programmed to control the flow of motor vehicles and pedestrians.

Tourist Accommodation

Any facility consisting of two or more rooms or dwellings units providing lodging and other accommodations for tourists and travelers.

Vehicle-Miles of Travel

A term meaning the number of miles that passenger and freight vehicles are driven.

APPENDIX

Report information prepared August 16, 2010
by Fulton County Health and Human Services Agency, Planning and Evaluation

Table 10. Health Information for Fulton Industrial Boulevard, 2005 – 2007 Average				
	Zip Code 30331		Fulton County	
Condition	Hospital Discharge Rate	Mortality Rate	Hospital Discharge Rate	Mortality Rate
Asthma	175.1	2.1	101.7	1.6
Emphysema	5.8	6.1	2.3	3.2
Bronchitis, Chronic and unspecified	109.3	0.0	82.6	-
Heart Disease	1413.8	307.2	847.5	184.7

Source: Georgia Department of Community Health Division of Public Health , Office of Health

Hospital discharge rates are the number of hospital discharges per 100,000 persons in the population.

Mortality rates are the number of deaths per 100,000 persons in the population.

Both rates are age-adjusted to account for the differences in the age composition of the two populations; this is done so that the rates from each geographic area can be compared.

Table 11. Census Data for Zip Code 30331 and Fulton County				
	Zip Code 30331		Fulton County	
	Count	Percent	Count	Percent
Total	44,444		992,137	
Under 5 years	3,432	7.7	71,684	7.2
5 to 9 years	3,862	8.7	68,894	6.9
10 to 14 years	3,739	8.4	67,096	6.8
15 to 19 years	3,139	7.1	68,065	6.9
20 to 24 years	3,104	7.0	64,467	6.8
25 to 34 years	6,421	14.4	145,964	14.7
35 to 44 years	6,475	14.5	170,879	17.2
45 to 54 years	6,128	13.8	148,108	14.9
55 to 59 years	2,433	5.5	62,464	6.3
60 to 64 years	1,856	4.2	45,922	4.6
65 to 74 years	2,388	5.4	44,568	4.5
75 to 84 years	1,098	2.5	23,049	2.3
85 years and over	369	0.8	10,977	1.1
18 and over	31,472	70.8	743,419	74.9
Under 18	12,972	29.2	248,718	25.1

Source: U.S. Census Bureau

Zip Code 30331 2000 population, Fulton County 2007 population.

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